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PRODUCTIVE MARKETING INCORPORATED

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May 18, 1981

Mr. Gary Smith, Plant Manager
Longview Fibre Company
Seattle Corrugation Co.
East Marginal Way South
Seattle, WA 98124

Ref: Spall repair and floor system for Longview Fibre Corrugation Plant
Seattle, Washington

Dear Gary,

As discussed during the first phase of the project, the existing concrete floor was far more deteriorated and in much worse condition than it appeared. The entire surface in many cases has delaminated from the substrate and any attempt to prepare it for surface treatment turned it to powder.

To properly rehibilitate the floor, this bad concrete had to be removed. This amounted to considerable more material and labor than anticipated in our original proposal. We suspected a small amount of further deterioration as noted in paragraph 2 under scope of work on the original proposal, but had no way to determine the actual amount until floor preparation began.

Due to the increased work as memtioned above, to not interfere with your work schedule we broke the project into two portions, I will refer to them as phase one (now complete, along dryer) and phase two (to be completed the weekend of May 22 Thru 25)

Phase two will not take as much extra mortar as phase one, due to the newer slab area poured around the rail area. However in a few areas where the roll grab forklifts have worn the concrete thin setting down rolls, we are adding Patches of Armour Coat, which is designed to resist severe abrasion of steel against concrete. This will be done at no further cost to you. The following is a break down of the work, and revised proposal.

Extra Work, not in original proposal for phase 1 & 2. Patching floor in other areas of plant.

1. Patch holes created by removal of guard rail

2 gal. Mortar Resin @ 66.48	=	$132.96
1 sk. Silica Sand	=	$ 7.00
3 M.H. @ 45.00	=	$135.00
Total		$274.96

2. Repair holes & Chip our around pipes & Repair after removing

In shipping area and aisle by millwrights.

8 gal. Mortar Resin @ 66.48	=	$531.84
18 M.H. @ 45.00	=	$810.00
4 sacks Silica Sand	=	$ 28.00
Total		$1364.84

3. Repair lower footing in final processing area.

1 gal. Mortar Resin	=	$66.48
½ sack Silica Sand	=	$ 3.50
3 M.H. Labor @ 30.00	=	$90.00
Total		$159.98

Summary

Extra no. 1 & 3 Total	= $434.94
Extra no. 2	=$1369.84
Total Extras to date	$1804.78

Extra no. 2 refundable upon completion of total aisle rehabilitation contract.

Original estimate phase 1 & 2	=	$30,628.00
Revesed (guaranteed maximum) 1 & 2	=	$39,000.00
Difference	=	$ 8,372.00

Total completed to date		
1/3 original estimate 30,628 ÷ 3	=	$10,209.00
Extra Mortar work phase 1	=	$ 8,372.00
Total completed to date	=	$18,581.33
Total other extras	=	$ 1,804.78
Total	=	$20,386.11
Prepaid on material to date	=(-$12,000.00)	
Material used fnom prepaid	+	3,000.00
Total balance due current		$11,386.11

Total balance due upon completion

Extras	=	$39,000.00
	=	$ 1,804.78
		$40,804.78
Sales Tax		$ 2,203.46
		$43,008.24

Paid to date material	=	$12,000.00
Progress Draw	=	$11,386.11

Total due upon completion phases 1 & 2 = $19,622.13

Respectfully submitted,

Ronald E. Holmwall
Productive Marketing Co.

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Elk Grove Village, Illinois 60007 U.S.A.
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technical bulletin

THERMAL-CHEM ARMOUR COAT
PRODUCT NO. 8

A concrete floor has limitations as to the amount of traffic it is able to withstand before uneven wear patterns develop, causing hazardous walking and driving conditions. Spillages from water and chemical solutions penetrate into the floor causing slippery surfaces and increasing the deterioration rate of the floor. Once spillages penetrate the laitance portion of the concrete floor, it is nearly impossible to maintain a safe, clean and presentable looking surface and in many localities health ordinances can close down a plant operation for the above problems.

Thermal-Chem Armour Coat, Product No. 8 was designed and perfected to eliminate or correct the above typical floor problems. Thermal-Chem Armour Coat is a modified epoxy system applied in a thin coating of approximately 25 mils thick over new or rehabilitated concrete, wood or steel surfaces. It quickly develops high compressive strengths providing excellent wear characteristics in a textured or smooth formula. It will withstand abuse from rubber tire or steel wheel vehicles. Its tensile and flexural properties which are superior to that of concrete will withstand extreme abuse from flat objects dropping to the treated floor. Thermal-Chem Armour Coat will not stress or damage the concrete on interior or cold storage applications.

When the two components are blended together prior to use, a non-reversible chemical reaction occurs, forming a 100 per cent solid crosslinked high molecular weight system. The Armour Coat system chemically and mechanically bonds to the concrete substrate. This system will adhere to moist concrete above temperatures of 33°F (1°c) or dry concrete temperatures above 15°F (-9°c). The workable range or applications are 140°F (60°c) to 15°F (-9°c). Two product cures are available; Normal Cure - 40°F (4.5°c) to 140°F (60°c) and Rapid Cure - 15°F (-9°c)to 140°F (60°c). The colder the substrate the longer the time required to become tack-free. Therefore, many times the faster setting rapid cure is used even during warm temperature applications.

Thermal-Chem Armour Coat's slip resistant surface is considerably more durable than the original concrete surface even when mineral or metallic hardners are added to the concrete. It is available in an attractive gray color. Thermal-Chem Armour Coat never rusts or dusts; affords minimum maintenance and provides permanent heavy duty floor protection. Thermal-Chem Armour Coat passes all rigid standards set by Federal and State health regulations.

PRODUCT DESCRIPTION:

FORM	Two component	
COLOR	Gray (Some special colors available on request)	
TYPICAL DENSITY	@77°F (25°c), lbs./gal.	
	Rapid Cure	Normal Cure
Textured	20.80±.2	20.35±.2
Smooth	14.25±.2	12.80±.2

MIX RATIO

Textured Component "A"	95.6 p.b.w.	94.2 p.b.w.
Textured Component "B"	4.4 p.b.w.	5.8 p.b.w.
Smooth Component "A"	90.0 p.b.w.	87.0 p.b.w.
Smooth Component "B"	10.0 p.b.w.	13.0 p.b.w.

STANDARD PACKAGING

5 gallon pails

SHELF LIFE

Two years minimum in sealed containers at 77°F (25°c).

TYPICAL PROPERTIES OF CURED SYSTEM at 77°F (25°c)

Moh's Scale Hardness 9.0+

Taber Abrasion Resistance
Test to simulate heavy industrial usage
1,000 gram load - CS-17 Resilient Calibrase wheels

Cycles	Thermal-Chem Armour Coat*	Portland Cement Concrete**
1,000	wt. loss - 0.004 gm. sq. in.	wt. loss - 0.114 gm. sq. in.
4,000	wt. loss - 0.007 gm. sq. in.	wt. loss - 0.160 gm. sq. in.
10,000	wt. loss - 0.008 gm. sq. in.	wt. loss - 0.211 gm. sq. in.

Thermal-Chem Armour Coat typically outwears 3,500 psi concrete by a factor of 25.

*Armour Coat specimen air cured 7 days, 72°F (25°c) 50% R.H.
**Concrete specimen air cured 28 days, 72°F (22°c) 50% R.H.

HOW TO USE THERMAL-CHEM ARMOUR COAT

SURFACE PREPARATION

Concrete and steel surfaces must be free from oil, dust, coatings, paints, rust and other contaminants. All unsound concrete must be removed by chipping, scarifying or power blasting. Sandblast or waterblast surface to remove contaminants, heavy laitance, sharp edges or protrusions, which will interfere with the uniform application of the coating. Ask your Thermal-Chem representative for the data sheet, Surface Preparation Bulletin Number TCI. The service life of a coating is primarily dependent upon good surface preparation.

New concrete should cure a minimum of 28 days; however, during warm weather periods the product may be applied when all shrinkage has stopped.

Remove all debris from working surfaces.

Acid etching is required only when the surface has a pH of 10 or over. Etch concrete surface after all other cleaning has been accomplished with a 10% solution of commercial muriatic acid only when surface pH is over 10. Wash surface with clean water to remove acid solution and retest pH. New concrete may require a second etching.

Do not apply etching solution unless required. Dry surfaces allow easier application of coating; however, product will adhere to clean, moist surfaces.

Weld all cracks together with Thermal-Chem Injection System.

Remove unsound existing patches, fill chuckholes and low deteriorated areas with Thermal-Chem Mortar, Product No. 3.

Relevel or develop proper grades for drainage with Thermal-Chem Mortar, Product No. 3.

EQUIPMENT

Hand trowels, rollers and squeegees are commonly used.

MIXING PROCEDURES

Poor mixing of epoxies is the common fault of bad applications. Follow these recommendations for best results. Open Component "A" and agitate resin until evenly blended. Open Component "B" and pour entire contents into Component "A" container. Agitate with low speed power mixer (200-600 RPM) until one even color develops. When temperatures are 50°F (10°c) or lower, preheat both components individually with an indirect source of heat to approximately 70°F (20°c) before blending together.

APPLICATION

Thermal-Chem Armour Coat is poured over the substrate, squeegeed thin, and hand finished with trowels.

STEPS OF APPLICATION

Primer

Immediately after cleaning the substrate, apply with rollers or brushes, Thermal-Chem Primer, Product No. 6, at the thickness of 5 to 6 mils on concrete and 3 to 4 mils on steel. Do not allow the Primer to become tack-free. If gel stage or curing develops, recoat dried areas with 2 to 3 mils thickness of Thermal-Chem Primer.

Armour Coat - Textured Finish

Spread Thermal-Chem Armour Coat evenly over the surface, squeegee as thin a coat as possible, and hand trowel to a 25 mil thickness. This may be applied in one application.

Armour Coat - Smooth Finish (optional application)

After Armour Coat, Textured Finish, has become tack-free, squeegee Thermal-Chem Armour Coat, Smooth Finish, over the surface just to fill small indentations in the coating. The smooth formula is never used alone for flooring systems.

TYPICAL APPLICATION RATES

Thermal-Chem Primer, Product No. 6

Concrete: 5-6 mils thick - 267-321 square feet per gallon
Steel: 3-4 mils thick - 401-535 square feet per gallon

Porosity of concrete will determine final coverage for Primer Coat.

Thermal-Chem Armour Coat - Textured Finish, Product No. 8

Concrete or steel: 25 mils thick - 70-75 square feet per gallon.

Thermal-Chem Armour Coat - Smooth Finish, Product No. 8

Average coverage will be 350-450 square feet per gallon.

TYPICAL CURE TIME

Normal Cure

Substrate with warmer temperatures, light traffic may be allowed over the treated surface areas 24 hours after application, and when substrate temperatures are below 50°F (10°c) wait 36 to 48 hours.

Rapid Cure

Substrate with warmer temperatures, light traffic may be allowed over the treated area 12 to 18 hours after application, and when substrate temperatures are below 50°F (10°c) wait 18 to 24 hours. When substrate temperatures are between 32°F (0°c) and 15°F (-9°c), wait 36 to 48 hours. Regular traffic may utilize the treated area on substrates with temperatures above 50°F (10°c) 24 hours plus the curing period stated above and on substrate temperatures below 50°F (10°c) 48 hours plus the curing period stated above.

CLEAN UP

All tools must be immersed or cleaned with mineral spirits, toluene, MEK, or xylene before curing occurs.

LIMITATIONS

Not recommended where exposure will include immersion or direct prolonged contact with sulphuric, nitric, citric and hydrochloric acids. Occasional spillages of the above acids cleaned up within short periods of time after the accident occurs will not harm the flooring system. If discoloration occurs and there is no softness or swelling the Armour Coat has not been damaged.

STORAGE OF MATERIALS

All Thermal-Chem products should be stored elevated from the floor on pallets, in an environment that maintains a constant temperature above 36°F (2°c). Do not allow Thermal-Chem products to freeze.

HANDLING AND TOXICITY

Warning: For Professional and Industrial Use Only! Each epoxy compound contains some materials that are toxic before cure. Skin contact with uncured material may cause Dermatitis. Prevent all contact with skin. If contact occurs, wash immediately with soap and water. Avoid inhalation of vapor. Use proper ventilation. Component "A" - SPI Classification 4, Component "B" -SPI Classification 3. Clean rubber gloves or disposable polyethylene gloves provide the best protection. The use of skin barrier creams is recommended. Avoid contact with the eyes. If contact should occur, flush immediately with water for 15 minutes and call a physician.